

(c) *Combustion air by mechanical means.* Combustion air furnished by mechanical systems, such as makeup air units, may be used when complete design data is submitted and approved by the department.

(d) *Combustion air by infiltration.* If the heating equipment is not required to be located in a fire-resistive room, combustion air may be provided by means of infiltration where the total area of outdoor openings is greater than 3% of the floor area in which the equipment is located, or where 150% of the air required for theoretical complete combustion is no greater than ¼ air change govern the design.

Note: See s. ILHR 64.22 for special conditions.

(2) **DAMPERS.** (a) Manually operated dampers are prohibited in combustion air intakes, except for manually fired solid-fuel fired equipment, where the combustion air is connected directly to the equipment.

(b) Motorized dampers are acceptable when interlocked with the burner. Dampers shall be open when the burner is in operation. A safety interlock switch shall be installed to insure that the damper is in an open position before the burner is permitted to operate.

(3) **DUCTWORK.** Where ductwork is required to bring combustion air into the building, the duct shall have the same cross-sectional area as the free area of the combustion air openings.

(4) **SEGREGATION OF COMBUSTION AIR.** The combustion air path shall be completely segregated from the outside air ventilation ductwork.

(5) **NEGATIVE PRESSURE LOCATIONS.** Atmospheric combustion shall be prohibited in a space under negative pressure.

(6) **MOUNTING HEIGHT.** Mounting height of the combustion air intakes shall be as required in s. ILHR 64.19 (1) (c).

(7) **AIR-HANDLING EQUIPMENT LOCATED IN A BOILER OR FURNACE ROOM.** If the fuel input rating of the fuel burning equipment exceeds 400,000 Btu per hour, the air-handling equipment and the fuel-burning equipment shall be interlocked to shut off the fuel-burning equipment and the air-handling equipment when any service door to the air-handling equipment is opened, unless an air barrier separation is provided between the fuel-burning equipment and the air handling equipment.

History: Cr. Register, December, 1975, No. 240, eff. 1-1-76; r. and recr. Register, December, 1976, No. 252, eff. 1-1-77; renum. (1) (b) and (c) to be (c) and (d), cr. (1) (b), and am. (7), Register, December, 1977, No. 264, eff. 1-1-78; am. (5), Register, December, 1978, No. 276, eff. 1-1-79; am. (1)(d), Register, January, 1980, No. 289, eff. 2-1-80; am. (1)(a) and (d) (2)(a), (5) and (7), Register, December, 1981, No. 312, eff. 1-1-82; am. (1) (d), Register, December, 1983, No. 336, eff. 1-1-84.

ILHR 64.10 Refrigerants. The rules covering the use of refrigerants for air conditioning systems shall conform with ch. ILHR 45, Mechanical Refrigeration.

History: Cr. Register, December, 1975, No. 240, eff. 1-1-76.

Part III—Ventilation and Air Standards

ILHR 64.11 Ventilation and air standards. The quantity of air used to ventilate a given space during periods of occupancy shall always be suffi-

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cient to maintain the standards of air distribution, air movement, recirculation, 64.12 to 64.19.

History: Cr. Register, December, 1975, No. 240, eff. 1-1-76.

ILHR 64.12 Definitions. (1) "Air conditioning." The process of treating air to control temperature, humidity, cleanliness and distribution to meet the requirements of the conditioned space.

(2) "Outside air." Air that is taken from outside the building and is free from contamination of any kind in proportions detrimental to the health or comfort of the persons exposed to it.

(3) "Recirculated air." The transfer of air from a space through the air-handling equipment and back to the space.

(4) "Tempered air." Air transferred from a heated or cooled area of a building.

(5) "Tempered outside air." Outside air heated or cooled before distribution.

(6) "Ventilation." The process of supplying or removing air by natural or mechanical means, to or from any space.

History: Cr. Register, December, 1975, No. 240, eff. 1-1-76; reprinted to correct error in (6), Register, December, 1985, No. 360.

ILHR 64.13 Tempered air requirements. (1) **SUPPLY AIR.** The design conditions of the supply air temperature to the occupied space shall be between 50° F. and 140° F.

(2) **TEMPERED AIR SUPPLY DEPENDING ON NEGATIVE PRESSURE.** A supply of tempered air, depending on a negative pressure within the space, will be permitted in foundries, steel fabricating shops and similar areas.

History: Cr. Register, December, 1975, No. 240, eff. 1-1-76.

ILHR 64.14 Tempered outside air requirements: (1) **MAKEUP AIR:** A supply of tempered outside air shall be provided when the total volume of building exhaust from an area exceeds one air change per hour.

Note: See Ch. Ind 1000-2000, Safety & Health Code, for further requirements for makeup air for industrial exhaust systems.

(2) **PROCESS HEAT:** Process heat may be used to temper required outside air.

History: Cr. Register, December, 1975, No. 240, eff. 1-1-76.

ILHR 64.15 Air movement and distribution. The air delivery capacity of all equipment supplying air for heating, ventilating and air conditioning purposes shall be based on standard air ratings.

Note: Standard air is substantially equivalent to dry air at 70° F. and 29.92 inches (Hg) barometric pressure.

History: Cr. Register, December, 1975, No. 240, eff. 1-1-76; renum. (2) and (3) to be 64.06 (3) and (4), r. (4), Register, December, 1976, No. 252, eff. 1-1-77.

FP ILHR 64.16 Air-cleansing devices: (1) **AIR-CLEANSING ACCESS.** Air-cleansing devices shall be designed and installed to permit access to the equipment for maintenance and to insure proper operation of the heating and ventilating system.

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(2) **AIR-CLEANSING FILTERS.** Approved air-cleansing filters shall be designed and installed in a manner to filter the outside air and recirculated air used with mechanical heating and ventilating systems except as follows:

(a) Filters are not required in garages, factories, foundries and similar occupancies;

(b) Filters are not required for use with unit heaters designed for heating and recirculation; or

(c) Where jet systems or blend-air systems are approved, air filters are not required in the ducts that are installed for the recirculation of air within the same occupied space.

Note: The department recognizes as approved, filters listed in the Building Materials List published by Underwriters Laboratories, Inc., and test data of any other recognized testing agency for the purpose for which it is used.

(3) **AIR-CLEANSING MATERIALS.** Contaminated water shall not be used or recirculated through sprays affecting air used for ventilating purposes.

History: Cr. Register, December, 1975, No. 240, eff. 1-1-76

ILHR 64.17 Controls. (1) **GENERAL.** Except as provided in sub. (2), automatic controls shall be provided to maintain design temperature, control ventilation to provide a continuous air movement of not less than the minimum required by this chapter, and to provide a continuous supply of outside air and exhaust determined by the provisions of s. ILHR 64.05, Table 1, during periods of occupancy.

(2) **EXCEPTION.** Manual control of solid-fuel fired equipment to maintain inside design temperature is permitted.

History: Cr. Register, December, 1975, No. 240, eff. 1-1-76; am. Register, December, 1981, No. 312, eff. 1-1-82.

ILHR 64.18 Contamination of air. (1) **CONTAMINATION.** Air contaminated from odors, fumes, noxious gases, smoke, steam, dust, spray, or other contamination shall be diluted with uncontaminated air or exhausted to prevent the contaminated air from spreading to other parts of the building occupied by people.

Note: For requirements pertaining to all places of poisons, or other detrimental materials are used, stored, handled, or are present in the air in sufficient quantities to obstruct the vision, or to be injurious to the health, safety or welfare of the employes or frequenters, see Ch. Ind 1000-2000—Safety and Health Code.

(a) **Chlorinated hydrocarbons.** Areas where chlorinated hydrocarbons are introduced shall be arranged to satisfy the following conditions:

Note: Some of the chlorinated hydrocarbons commonly used are: trichloroethylene, perchloroethylene, carbon tetrachloride, methylene chloride, methyl chloroform, Freon F-11, Freon F-12, Freon F-21 and Freon F-114. For example, these materials are used in dry cleaning establishments, in degreasing operations, and where pressure can propellants are used. Pressure cans are used for such products as enamels, lacquers, paint removers, stencil inks, lubricants, pesticides, hair sprays, shaving lathers, shampoos and colognes.

1. The area shall have an exhaust system capable of maintaining a negative pressure within the enclosed area.

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2. The volume and distribution of air movement within the area shall be such that the average threshold limit values of specific airborne contaminants are not exceeded.

Note: See chs. Ind 1000-2000, Wisconsin Safety and Health Code.

3. No fuel-fired heating unit, with or without a heat exchanger, shall be located within this area, nor shall it recirculate air from this area.

4. The surface temperatures of any type of heating equipment used in these areas shall be below the temperature at which toxic materials may be released.

Note: Toxic materials are those covered in Ch. Ind 1000-2000—Safety and Health Code.

(b) *Transfer of contaminated air.* Air shall not be transferred from an area of greater contamination.

Note: The department will accept air transferred from: corridor to toilet room; corridor to cloak room or janitor closet; dining room to kitchen; locker room to toilet room; gymnasium to locker room; showroom to garage; and corridor to school vocational shops.

History: Cr. Register, December, 1975, No. 240, eff. 1-1-76; am. (1)(a)3., Register, January, 1980, No. 289, eff. 2-1-80.

FP ILHR 64.19 Location of outside ventilating air intakes or exhausts for mechanical ventilation systems. (1) **LOCATION AND DISTANCE.** (a) *Location to prevent contamination.* Outside air intake openings shall be located so as to minimize contamination of outdoor air, but in no case shall the distance be less than 10 feet measured in any direction from outlets emitting products of combustion, exhaust vents and plumbing vents. Openable windows are exempt from the provisions of this paragraph, except that power vents from gas-fired equipment shall be located at least 12 inches measured in any direction from any openable windows.

Note: This requirement also applies to roof-top heating and ventilating equipment.

(b) *Distance to adjacent properties.* Air intakes and exhausts shall be at least 10 feet from a property line or lot line or both or an adjacent building on the same property. This distance restriction does not apply to property lines along streets or alleys.

(c) *Mounting height.* The lowest side of outside air intake openings shall be located at least 12 inches above outside grade, above adjoining roof surfaces, or above the bottom of an areaway.

Note: The department will accept outside air intakes in areaways provided the minimum horizontal cross section of the areaway is equal to the free area of the opening, a grating is provided over the areaway with a free area equal to the required air intake, and the grating is designed for a minimum of 100 PSF live load. A guardrail, as defined in s. ILHR 51.162, will be accepted in lieu of the grating.

(2) **SCREENS.** All outside air intake openings shall be provided with a device to prevent intake of foreign material of ½ inch size or larger.

(3) **WEATHER PROTECTION.** All outside air intake openings shall be protected against weather and water with a weatherproof hood or louvers.

(4) **ACCESSIBILITY AND CLEANLINESS.** All outside air intakes shall be easily accessible for cleaning and shall be kept clean and sanitary.

(5) **DAMPERS.** (a) *Intake.* All required outside air intakes shall be equipped with a damper with automatic controls which will close the

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damper and prevent the intake of outside air into the building when the ventilating unit is not in operation.

(b) *Exhaust.* All exhaust openings shall be provided with automatic or self-activating back-draft dampers to prevent the intake of outside air into the building when the exhaust units are not in operation.

History: Cr. Register, December, 1975, No. 240, eff. 1-1-76; am. (5) (a), Register, December, 1976, No. 252, eff. 1-1-77; reprinted to correct error in (1) (c), Register, December, 1985, No. 360.

Part IV—Heating Equipment Requirements

ILHR 64.20 Equipment ratings and safety controls. (1) **TEST AND INSTALLATION STANDARDS.** All oil- and gas-fired heating equipment, electric heating equipment, solid-fuel heating equipment and accessory equipment or devices shall be tested and installed in accordance with standards recognized by the department. Department review and approval of input or output ratings or both are required when ratings are needed to satisfy s. ILHR 64.03 or 64.09.

Note: For a list of standards acceptable to the department, refer to Appendix A.

(2) **SAFETY CONTROLS.** (a) *General.* The complete safety control package for the heating and ventilating equipment shall comply with standards accepted by the department.

(b) *Limits and controls.* Oil and gas-fired heating equipment and electric heating equipment shall be equipped with primary (flame safeguard) safety controls, safety limit switches, and burners or electric elements that comply with standards accepted by the department.

Note: The department recognizes UL 296—Oil Burners, and UL that satisfy the requirements of subs. (1) and (2).

(3) **LISTED EQUIPMENT.** Complete factory assembled heating units shall be labeled by listing agencies approved by the department.

Note: The department accepts heating equipment listed by American Gas Association (AGA), Underwriters' Laboratories—(UL) and PFS corporation.

(4) **UNLISTED EQUIPMENT.** If the heating equipment is unlisted, the following provisions shall be taken:

(a) *Manufacturer's statement.* A statement from the equipment manufacturer shall be provided indicating the national standard with which the equipment complies.

(b) *Tests.* A test by a Wisconsin registered engineer shall be conducted on the output and safety controls, in accordance with the national standard used by the manufacturer. A statement regarding the test of the rating and safety controls shall be furnished for each installation unless an approval for the equipment is obtained from the department in accordance with sub. (5).

(5) **EQUIPMENT APPROVAL.** Equipment approval may be obtained from the department upon submission of a technical report, based on the test

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required in sub. (4) (b), together with the fee as specified in ch. Ind 69 for equipment approval.

Note: The purpose of the technical report is to show that the equipment is in complete compliance with the national standard by which the equipment is designed, constructed and tested.

History: Cr. Register, December, 1975, No. 240, eff. 1-1-75; r. and recr. Register, December, 1976, No. 252, eff. 1-1-77; am. (5), Register, December, 1977, No. 264, eff. 1-1-78; am. (1), Register, December, 1981, No. 312, eff. 1-1-82.

FP ILHR 64.21 Location of equipment. The various types of heating equipment for the corresponding types of occupancies in which the equipment may be located shall be installed as specified in Table 64.21.

Note #1: The footnotes below the table designate special requirements for the listed equipment.

Note #2: The department will accept net ratings as listed by Mechanical Contractors Association of America, Inc., Institute of Boiler and Radiator Manufacturers, and equipment tested according to commercial standard 140-47.

where all vehicles displayed in the showroom are without batteries and fuel tanks are empty and free of fumes.

Note: A live storage area is any area used for storage of fire trucks, tractors, automobiles, trucks, and similar self-propelled vehicles which are driven in and out of the storage area under their own power; it does not include areas where vehicles and equipment are stored for seasonal periods, or areas where vehicles are displayed without batteries and where the gasoline tanks of the vehicles are empty and free of fumes.

(2) **VENTILATION.** The air movement, supply and distribution shall be provided in accordance with the requirements of s. ILHR 64.05, Table 1.

(a) *Separate ventilating system.* A separate ventilating system shall be provided for showrooms or offices where such occupancies are adjacent to repair or live storage areas.

Note: Ventilation is not required if an openable area is provided to conform with the requirements of s. ILHR 64.07.

(b) *Recirculation.* Air shall not be recirculated from any repair, live storage or service area unless the total volume of air in circulation is in excess of the ventilation required. Excess air may be recirculated.

(c) *Contaminants.* If the provisions of this section do not provide sufficient ventilation to meet the standards for threshold limit values covered in chs. Ind 1000-2000—Safety and Health Code, the additional exhaust requirements with an equivalent volume of outside air shall be provided to satisfy the requirements found in chs. Ind 1000-2000.

History: Cr. Register, December, 1975, No. 240, eff. 1-1-76; am. (1), Register, December, 1983, No. 336, eff. 1-1-84.

ILHR 64.65 General sanitation and service areas. (1) SCOPE. This classification shall include toilet rooms, locker rooms, shower rooms and janitor closets.

Note #1: A janitor closet is a service closet with one or more plumbing fixtures.

Note #2: For exhaust ventilation requirements in hospital service areas, see s. ILHR 64.57.

Note #3: For exhaust ventilation requirements in places of employment, see s. ILHR 64.54.

Note #4: The use of wall registers within 4 inches of the floor, baseboard registers, and floor registers is prohibited in these areas. (See s. ILHR 52.57, Note.)

Note #5: The rules of this section are not intended to preclude the use of energy recovery wheels, plate type heat exchangers or similar energy recovery equipment.

(2) **EXHAUST VENTILATING SYSTEMS.** Exhaust ventilating systems serving this class of occupancy may be combined with other exhaust services provided the combined system:

(a) Does not allow recirculation; and

(b) Does not include grease hood exhaust, radioactive exhaust, fume hood exhaust, exhaust required by chs. Ind 1000-2000, exhaust that requires electrical grounding, or exhaust that requires spark resistant fan construction.

(3) **VENTILATION.** The air movement, supply and distribution shall be provided in accordance with the requirements of s. ILHR 64.05, Table 1.

(a) *Exhaust ventilation.* Exhaust ventilation shall be provided for all areas of this class unless otherwise exempted. The volume of air exhausted shall be provided at a rate of not less than 2 cubic feet per minute

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per square foot of floor area, or 60 cubic feet per minute per fixture (water closets and urinals). Mechanical exhaust ventilation shall be installed in toilet rooms having more than one fixture (water closets and urinals). The effectiveness of the exhaust shall be greater than the supply.

(b) *Natural ventilation.* Exhaust ventilation is not required from toilet rooms having one water closet or one urinal, or from janitor closets having one service sink or receptor, provided the room has an outside window of at least 4 square feet with at least 2 square feet that is openable.

1. Exception. Mechanical exhaust ventilation may be omitted from toilet rooms or bathrooms having one water closet or urinal except in taverns and restaurants, or from janitor closets having one service sink or receptor, where an approved ductless air circulating and treatment device is provided.

(c) *Locker, shower and toilet room ventilation.* Adjoining locker, shower and toilet rooms shall be exhausted at the rate of 2 cubic feet per minute per square foot of area, based on the floor area of the largest space. The rooms shall be provided with tempered makeup air supplied directly from the outside or transferred from other areas of the building in accordance with the requirements of s. ILHR 64.18. A negative pressure relationship shall be maintained in the shower and toilet rooms with respect to the locker room.

History: Cr. Register, December, 1976, No. 240, eff. 1-1-76; am. (1), cr. (3) (c) and r. (4), Register, December, 1976, No. 252, eff. 1-1-77; cr. (3) (b) 1, Register, December, 1977, No. 264, eff. 1-1-78; am. (3) (b) 1, Register, December, 1981, No. 312, eff. 1-1-82; am. (3) (b) 1, Register, December, 1983, No. 336, eff. 1-1-84; r. and recr. (2), Register, August, 1985, No. 356, eff. 1-1-86; reprinted to correct an error in (2) (Intro.), Register, December, 1985, No. 360.

ILHR 64.66 Natatoriums. (1) **POOL VENTILATION.** In natatoriums, a volume of tempered outside air supply and exhaust shall be provided at the rate of at least 2 cubic feet per minute per square foot of pool surface. The volume of tempered outside air and exhaust may be reduced to a minimum of one cubic foot per minute per square foot of pool surface provided humidity controls are used to limit the relative humidity to 60%.

(2) **AIR MOVEMENT.** The air movement in a natatorium shall be not less than 6 air changes per hour unless mechanical cooling is provided to satisfy the heat gain requirement for the space.

History: Cr. Register, December, 1976, No. 252, eff. 1-1-77.

ILHR 64.67 Kitchens (1) **SCOPE.** This classification includes all areas where food is prepared (except in domestic science educational facilities from grades kindergarten through 12, and single unit apartments in hotels, motels and apartment buildings).

(2) **EXHAUST VENTILATION SYSTEMS.** Exhaust ventilation systems serving this occupancy shall not be used for any other service.

(a) *Required exhaust ventilation.* When cooking equipment is being operated, mechanical exhaust ventilation shall be provided at a rate not less than 2 cubic feet per minute per square foot of floor area for every occupied area within the scope of this section. When cooking equipment is not being operated, a minimum supply of outside air and exhaust at the rate of 5 CFM per person or natural ventilation as specified in s. ILHR 64.07 shall be provided during periods of occupancy.

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